Aortic CT: Intramural Hematoma

Leslie E. Quint, M.D.
• 43 M
• Mid back pain X several months
What type of aortic disease?

A. Aneurysm with intraluminal thrombus
B. Chronic dissection with thrombosed false lumen
C. Acute intramural hematoma
D. Penetrating atheromatous ulcer
• Aneurysm
• Treated with open repair
<table>
<thead>
<tr>
<th>Intramural Hematoma</th>
<th>ATS &amp; Intraluminal Thrombus</th>
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</thead>
<tbody>
<tr>
<td>Long segment</td>
<td>Shorter segment</td>
</tr>
<tr>
<td>Normal diameter ao</td>
<td>Aneurysmal aorta</td>
</tr>
<tr>
<td>Smooth interface</td>
<td>Irregular/lobulated interface</td>
</tr>
<tr>
<td>Displaced intimal calcification</td>
<td>No displaced intimal calcification</td>
</tr>
</tbody>
</table>
Intramural hematoma
Atherosclerotic aneurysm with intraluminal thrombus
• 78 F
• Chest pain X 2 weeks
What type of aortic disease?

A. Aneurysm with intraluminal thrombus
B. Acute intramural hematoma
C. Penetrating atheromatous ulcer
D. A and C
• Acute, type B intramural hematoma
• Long, longitudinal intimal tear
• Dilated aorta
• Treated with endograft
Intramural Hematoma

• Pre-contrast:
  – Crescentic / circumferential hi attenuation in aortic wall
  – Up to 2 wks s/p acute event

• Post-contrast: smooth, non-enhancing, thick aortic wall

• Displaced intimal Ca++

Chao CP. Radiographics 2009;29:791
Intramural Hematoma

Pathology
• Bleeding into the medial layer of the aortic wall
Intramural Hematoma

Etiologies

• Rupture of vasa vasorum due to degenerative changes in the media
• Intact intima

Courtesy of Jay Faust, M.D.
Intramural Hematoma

Etiologies

- Intimal tear with hematoma in the aortic wall (false lumen)
  - Tear nonvisualized
  - Tear appears as ulcer-like projection
Intramural Hematoma

Etiologies

• Intimal tear with hematoma in the aortic wall (false lumen)
  – Tear nonvisualized
  – Tear appears as ulcer-like projection

Lee CW. Int J Cardiovasc Imaging 2010;26:295
Large intimal tear with outpouching of contrast
Intramural Hematoma

Etiologies

• Bleeding associated with penetrating atheromatous ulcer

• Rarely trauma

Baikoussis NG. J Cardiothor Surg 2009;4:54
Lee CW. Int J Cardiovasc Imaging 2010;26:295
Yoo SM. RCNA 2010;48:67
• 86 M
• Cough and 10 lb wt loss X 2 months
• CXR → CT
• No acute distress
What type of aortic disease?

A. Ruptured aneurysm
B. Ruptured intramural hematoma from penetrating atheromatous ulcer
C. Ruptured double barreled dissection
D. Ruptured intramural hematoma from an intimal tear
• Penetrating atheromatous ulcer
• Intramural hematoma and rupture
• Endograft placed
Penetrating Atheromatous Ulcer

- Extensive atheromatous disease
- Irregular outpouching, adjacent plaque
- Usually in descending thoracic aorta
Intramural Hematoma

Demographics

• Usually in older patients (except genetic syndromes)
• Majority of patients have hypertension
• Many patients have atherosclerosis with or without aneurysm
• Presentation: acute chest and/or back pain
• ~ 6-20% of acute aortic syndromes

Baikoussis NG. J Cardiothor Surg 2009;4:54
Chao CP. Radiographics 2009;29:791
Evangelista A. Circulation 2005;111:1063
Litmanovich D. AJR 2009;193:928
Svensson LG Ann Thor Surg 2008;85:S1
Intramural Hematoma

- More common in descending aorta vs ascending aorta
- Similar mortality to classical AD
  - 8% descending
  - 39% ascending
  - Rupture or end organ ischemia
- Less likely to have malperfusion, pulse deficits, or aortic valve insufficiency than classical AD

Evangelista A. Circulation 2005;111:1063
Svensson LG Ann Thor Surg 2008;85:S1
Intramural Hematoma

Treatment

• Beta blockers to reduce aortic wall stress and control hypertension

Baikoussis NG. J Cardiothor Surg 2009;4:54
Intramural Hematoma

Treatment

• Beta blockers to reduce aortic wall stress and control hypertension
• Type A: controversial; usually surgery
• Type B:
  – Observation
  – Surgery (open or endovascular)
    • persistent or recurrent pain
    • aneurysm formation, ↑ hematoma, leaking, long longitudinal tear
    • Re-dissection, long longitudinal tear

Baikoussis NG. J Cardiothor Surg 2009;4:54
Intramural Hematoma

**Treatment**

- Endograft for:
  - intimal defect
  - leakage
- Friable wall due to hematoma may lead to new tears at endograft landing zones

Baikoussis NG. J Cardiothor Surg 2009;4:54
Intramural Hematoma

High risk features
- Type A
- Aortic diameter > 4.5 cm
- Thickness > 10 mm
- Ulcer like projections
- Age > 70

Buckley O. Int J Cardiovasc Imaging 2010;26:65
• 68 M
• Follow-up known aortic aneurysm
• New severe back pain X 1 day
What type of aortic disease?

A. Aneurysm with intraluminal thrombus
B. Chronic dissection with thrombosed false lumen
C. Acute intramural hematoma
D. Combination of A and C
New intramural hematoma in pre-existing aneurysm
Treated with endograft
Aortic Aneurysms and IMH

• Two major complications of aneurysms:
Aortic Aneurysms and IMH

• Two major complications of aneurysms:
  – Dissection (including IMH)
  – Rupture

• Aneurysm and IMH may be seen together
Intramural hematoma and aneurysm with intraluminal thrombus
• 73 M
• Sudden onset of pleuritic chest pain, back pain, and shortness of breath while at the chiropractor
• Hypotensive in emergency department
Intramural hematoma or double barreled dissection?
Intramural hematoma or double barreled dissection?
• Some aortic segments may show IMH and others may show double barreled dissection

• IMH and double barreled dissection may co-exist in same segment of aorta
• 59 F
• Severe chest pain radiating to back while shoveling snow
• Some aortic segments may show IMH and others may show double barreled dissection
• IMH and double barreled dissection may co-exist in same segment of aorta
• IMH may evolve into double barreled dissection
• 53 M
• Pronounced non productive cough with pleuritic chest pain
• Transferred from OSH
• Type A intramural hematoma
• Large intimal tear
• Intramural blood pools in false lumen
• Due to tiny intimal tears
• Or branch artery pseudo-aneurysms at origins of branch vessels

Williams, DM. JVIR 2006;17:765
Williams, DM. JVIR 2006;17:773
Wu M. Radiology 2011;258:705
• 69 F
• History of previous Type B intramural hematoma
• Now left sided chest pain s/p MVA
Branch artery pseudoaneurysm